

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment filed on July 3, 2008 has been carefully considered. Claims 4, 5, 17-19, 23, 26, 37, 38, 42 and 49-51 are cancelled. Claims 1-3, 6-16, 20-22, 24, 25, 27-36, 39-41, 43-48 and 52 are under consideration.

### ***Claim Objections***

2. Claims 36, 46 and 47 are objected to because of the following informalities:

In claim 36, line 30: The Examiner suggests inserting the phrase --and vapor from the recycle tank-- after "recovery unit", since the first fractionation column additionally receives vapor from the recycle tank, as set forth under item (h).

In claim 46, line 18: "the recycle tank" should be changed to --a recycle tank--.

In claim 47, line 2: "a recycle tank" should be changed to --the recycle tank--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 15, 16, 20-22, 24, 36, 39-41, 43 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 15 (at lines 16-17) and claim 36 (at line 16), the limitation of "a low pressure chamber" renders the claims claim indefinite. The term "low" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of

ordinary skill in the art would not be reasonably apprised of the scope of the invention. The Examiner suggests, for example, changing the limitation to --an additional pressure chamber--.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hottovy et al. (WO 00/53306) in view of Sherk et al. (US 4,501,885) and Salmon (US 6,566,460).

Regarding claims 46 and 47, Hottovy et al. (figure; generally, page 2, line 30 to page 12, line 5) discloses a method of processing effluent of a polymerization reactor (i.e., loop reactor 10), the effluent comprising hydrocarbon liquid and polymer solids, the method comprising:

separating a majority of the hydrocarbon liquid from the polymer solids in the effluent by flashing the majority of the hydrocarbon liquid (i.e., in a high pressure flash chamber 28; see page 8, line 29 to page 9, line 31) to generate a hydrocarbon vapor;

transporting (i.e., in line 32, 62) and condensing the hydrocarbon vapor (i.e., using a

diluent recycle cooler **68**) to form a recovered hydrocarbon liquid; transporting an equilibrium vapor (i.e., in line **76**) of the recovered hydrocarbon liquid without compression to a fractionation system (i.e., comprising columns **92**, **98**); and recycling at least a portion of the recovered hydrocarbon liquid (i.e., in line **74**) to the polymerization reactor **10** without fractionating the recovered hydrocarbon liquid, wherein the recycling comprises transporting the recovered hydrocarbon liquid to a recycle tank (i.e., a surge vessel **72**) and pumping (i.e., using pump **77**) the recovered hydrocarbon liquid from the recycle tank **72** to the polymerization reactor **10**, (see page 6, lines 22-31).

Hottovy et al. further suggests the provision of some form of polymer solids purging process, since it is disclosed that, “[o]ther minor diluent-containing streams such as fluff drying purge (typically containing, in addition to diluent, minor amounts of lights such as nitrogen and ethylene as well as 1-hexene comonomer) can also be fed to degassing column **92** if desired,” (see page 8, lines 8-11). Hottovy et al., however, is silent as to the process comprising the instantly claimed purging process steps.

Sherk et al. (see figure; column 2, line 10 to column 4, line 25) teaches a polymer solids purging process comprising the steps of purging the polymer solids (i.e., in a purge column **20**) with a purge gas (i.e., nitrogen) to remove residual hydrocarbon entrained in the polymer solids and to form a first stream comprising the purge gas and the residual hydrocarbon; and separating purge gas from the first stream (i.e., in a recovery zone comprising elements **42**, **44**, **48**, etc.) to form a second stream comprising separated purge gas (i.e., in line **50**) and a third stream comprising primarily hydrocarbon (i.e., labeled as isobutane; other suitable hydrocarbon diluents discussed at column 2, lines 19-28). Sherk et al. discloses that the separated hydrocarbon fluid

(i.e., the third stream) can be passed to a purification zone where it can readily be purified for reuse in the polymerization process (see column 3, lines 2-5).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide the purging process steps as taught by Sherk et al. in the process of Hottovy et al., because the purging of polymer solids in combination with the separation/recovery of hydrocarbon fluid from the purge gas would have minimized operating costs and hydrocarbon emissions, by allowing for the residual hydrocarbon to be recovered and reused in the polymerization process, as taught by Sherk et al. (see column 1, lines 27-59; column 3, lines 2-5). Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to transport the third stream to the fractionation system (i.e., column 92) in the modified process of Hottovy et al., in order to provide the further purification as suggested by Sherk et al. (see column 3, lines 2-5) and Hottovy et al. (see page 8, lines 8-11).

The combination of Hottovy et al. and Sherk et al. fails to disclose a single pressure zone. Salmon, however, teaches that as an alternative to two pressure zones (i.e., vessels 321 and 371; FIG. 3; column 6, line 41 to column 7, line 24), flashing of hydrocarbon liquid may occur in a single pressure zone (i.e., vessel 121; FIG. 1; column 5, line 60 to column 6, line 40). It would have been obvious for one of ordinary skill in the art at the time the invention was made to use a single pressure zone, as an alternative to two pressure zones, for flashing the hydrocarbon liquid in the process of Hottovy et al., because both the single and the two-stage pressure zones would have been considered known and suitable alternatives for providing the same function of flashing the hydrocarbon liquid, as taught by Salmon. Furthermore, one having ordinary skill in the art would have recognized that using a single pressure zone would have reduced equipment costs.

Regarding claim 48, Hottovy et al. discloses processing the equilibrium vapor in the fractionation system **92,98** to generate a diluent substantially free of olefin for use in catalyst preparation and delivery (i.e., by recycling the diluent in line **102** to a catalyst mud pot **106**; see column 10, line 25 to page 11, line 4).

*Response to Arguments*

5. Applicant's arguments with respect to the rejection of claims 46-48 under 35 U.S.C. 102(b) as being anticipated by Hottovy et al. have been considered, but they are moot in view of the new ground of rejection, necessitated by amendment. In particular, the claims are now rejected under 35 U.S.C. 103(a) as unpatentable over Hottovy et al. (WO 00/53306) in view of Sherk et al. (US 4,501,885) and Salmon (US 6,566,460). Claim 46 recites, “transporting the third stream to the recycle tank or to a fractionation system, or a combination thereof.” (lines 18-19, emphasis added). The Examiner asserts that it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide the step of transporting the third stream to the fractionation system in the modified process of Hottovy et al., in order to provide the further purification as specifically suggested by Sherk et al. (see column 3, lines 2-5) and Hottovy et al. (see page 8, lines 8-11). Salmon further teaches a single pressure zone (FIG. 1).

*Allowable Subject Matter*

6. Claims 1-3, 6-14, 25, 27-35, 44 and 52 are allowable. The prior art does not disclose or adequately suggest a process for slurry polymerization and separation of hydrocarbon fluid from solid polymer particles and purge gas comprising the instantly claimed process steps, wherein, in particular, the process includes the steps of passing at least a first portion of the recovered hydrocarbon fluid stream from the recovery zone to a fractionation zone; and passing a second

portion of the recovered hydrocarbon fluid stream from the recovery zone to the recycle zone.

7. Claims 15, 16, 20-22, 24 and 45 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. The prior art does not disclose or adequately suggest an apparatus for slurry polymerization and separation of hydrocarbon fluid from solid polymer particles and purge gas comprising the claimed combination of elements, wherein, in particular, the apparatus comprises a recycle tank adapted to receive condensed hydrocarbon vapor from the condenser, and further adapted to receive a second hydrocarbon fluid stream from the hydrocarbon/purge gas recovery unit.

8. Claims 36, 39-41 and 43 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. The prior art does not disclose or adequately suggest an apparatus for slurry polymerization and separation of hydrocarbon fluid from solid polymer particles and purge gas comprising the claimed combination of elements, wherein, in particular, the apparatus comprises a recycle tank adapted to receive hydrocarbon liquid from the condenser and further adapted to receive hydrocarbon fluid from the hydrocarbon/purge gas recovery unit; and a conduit fluidically connecting the first fractionation column with the hydrocarbon/purge gas recovery unit, wherein the first fractionation column processes the hydrocarbon fluid from the recovery unit (and the vapor from the recycle tank).

#### *Conclusion*

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/  
Primary Examiner, Art Unit 1797